

What is claimed is:

1. An isolated *T2R76* nucleic acid molecule comprising:
  - (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2;
  - (b) an isolated nucleic acid molecule of SEQ ID NO:1; or
  - (c) an isolated nucleic acid molecule substantially similar to SEQ ID NO:1.
2. The isolated *T2R76* nucleic acid molecule of claim 1 selected from the group consisting of:
  - (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2;
  - (b) an isolated nucleic acid molecule of SEQ ID NO:1;
  - (c) an isolated nucleic acid molecule which hybridizes to a nucleic acid sequence of SEQ ID NO:1 under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a T2R76 polypeptide; and
  - (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a T2R76 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.
3. The isolated *T2R76* nucleic acid molecule of claim 1 comprising:
  - (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2; or
  - (b) an isolated nucleic acid molecule of SEQ ID NO:1.

4. A method for detecting a *T2R76* nucleic acid molecule, the method comprising:

- (a) procuring a biological sample having nucleic acid material;
- (b) hybridizing an isolated *T2R76* nucleic acid molecule under stringent hybridization conditions to the biological sample of (a), thereby forming a duplex structure between the isolated *T2R76* nucleic acid and a nucleic acid within the biological sample; and
- (c) detecting the duplex structure of (b), whereby a *T2R76* nucleic acid molecule in the biological sample is detected.

5. An isolated *T2R76* polypeptide comprising:

- (a) a polypeptide of SEQ ID NO:2;
- (b) a polypeptide substantially identical to SEQ ID NO:2;
- (c) a polypeptide encoded by a nucleic acid molecule of SEQ ID NO:1; or
- (d) a polypeptide encoded by a nucleic acid molecule substantially identical to SEQ ID NO:1.

6. The isolated *T2R76* polypeptide of claim 5, further comprising a polypeptide encoded by a nucleic acid molecule selected from the group consisting of:

- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2;
- (b) an isolated nucleic acid molecule of SEQ ID NO:1;
- (c) an isolated nucleic acid molecule which hybridizes to a *T2R76* nucleic acid sequence under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a *T2R76* polypeptide; and
- (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due

to the degeneracy of the genetic code, and which encodes a T2R76 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.

7. The isolated T2R76 polypeptide of claim 5 comprising SEQ ID NO:2.
8. An isolated T2R polypeptide according to Claim 5 which is associated with at least one other T2R polypeptide.
9. The isolated T2R polypeptide of Claim 8 wherein said other T2R polypeptide is another human T2R.
10. The isolated T2R polypeptide of Claim 9 wherein said other human T2R is selected from the group consisting of human T2R51, T2R54, T2R55, T2R61, T2R63, T2R64, T2R65, T2R67, T2R71, T2R75, T2R59 and T2R33.
11. A method for producing an antibody that specifically recognizes a T2R76 the isolated nucleic acid of one of (a), (b), and (c) above.
12. The method of claim 10, wherein the isolated T2R76 polypeptide comprises SEQ ID NO:2.
13. The method of claim 8, further comprising preparing a monoclonal antibody.
14. An antibody produced by the method of claim 11.
15. A method for detecting a level of a T2R76 polypeptide, the method comprising
  - (a) obtaining a biological sample having peptidic material;
  - (b) detecting a T2R76 polypeptide in the biological sample of (a) by immunochemical reaction with the antibody of claim 14, whereby an amount of T2R76 polypeptide in a sample is determined.

16. A system for heterologous expression of a T2R76 polypeptide comprising:
  - (a) a T2R76 polypeptide; and
  - (b) a heterologous host cell expressing the T2R76 polypeptide.
17. The system of claim 16, wherein the T2R76 polypeptide comprises:
  - (a) a polypeptide of SEQ ID NO:2;
  - (b) a polypeptide substantially identical to SEQ ID NO:2;
  - (c) a polypeptide encoded by a nucleic acid molecule of SEQ ID NO:1; or
  - (d) a polypeptide encoded by a nucleic acid molecule substantially identical to SEQ ID NO:1.
18. The system of claim 17, wherein the T2R76 polypeptide further comprises a polypeptide encoded by a nucleic acid molecule selected from the group consisting of:
  - (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2;
  - (b) an isolated nucleic molecule of SEQ ID NO:1;
  - (c) an isolated nucleic acid molecule which hybridizes to a T2R76 nucleic acid sequence under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a T2R76 polypeptide; and
  - (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a T2R76 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.

19. The system of Claim 18, wherein the isolated T2R76 polypeptide comprises SEQ ID NO:2.
20. The system of Claim 18 which further comprises a nucleic acid encoding another T2R.
21. The system of Claim 16, wherein the host cell comprises a mammalian cell.
22. The system of Claim 21, wherein the mammalian cell comprises a human cell.
23. The system of Claim 16, wherein the host cell further comprises a G protein alpha subunit capable of coupling to a T2R76 polypeptide.
24. The system of Claim 23, wherein the G protein alpha subunit comprises a promiscuous G protein.
25. The system of Claim 24, wherein the promiscuous G protein comprises G $\alpha$ 15.
26. The system of Claim 24, wherein the promiscuous G protein comprises transducin or gustducin.
27. A method for identifying a modulator of a T2R76 polypeptide, the method comprising:
  - (a) providing a recombinant expression system whereby a T2R76 polypeptide is expressed in a heterologous host cell alone or in combination with at least one other T2R polypeptide,
  - (b) providing a test substance to the system of (a);
  - (c) assaying a level or quality of T2R76 function in the presence of the test substance;

- (d) comparing the level or quality of T2R76 function in the presence of the test substance with a control level or quality of T2R76 function; and
  - (e) identifying a test substance as a T2R76 modulator by determining a level or quality of T2R76 function in the presence of the test substance as significantly changed when compared to a control level or quality of T2R76 function.
28. The method of Claim 27, wherein the T2R76 polypeptide comprises:
- (a) a polypeptide of SEQ ID NO:2;
  - (b) a polypeptide substantially identical to SEQ ID NO:2;
  - (c) a polypeptide encoded by a nucleic acid molecule of SEQ ID NO:1; or
  - (d) a polypeptide encoded by a nucleic acid molecule substantially identical to SEQ ID NO:1.
29. The method of Claim 28, wherein the T2R76 polypeptide further comprises a polypeptide encoded by a nucleic acid molecule selected from the group consisting of:
- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2;
  - (b) an isolated nucleic molecule of SEQ ID NO:1;
  - (c) an isolated nucleic acid molecule which hybridizes to a T2R76 nucleic acid sequence under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a T2R76 polypeptide; and
  - (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above, in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a T2R76

polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.

30. The method of claim 29, wherein the isolated T2R76 polypeptide comprises SEQ ID NO:2.

31. The method of claim 27, wherein the host cell comprises a mammalian cell.

32. The method of claim 31, wherein the mammalian cell comprises a human cell.

33. The method of claim 27, wherein the host cell further comprises a G protein alpha subunit capable of coupling to a T2R76 polypeptide.

34. The method of claim 33, wherein the G protein alpha subunit comprises a promiscuous G protein.

35. The method of claim 34, wherein the promiscuous G protein comprises G $\alpha$ 15.

36. The method of claim 34, wherein the promiscuous G protein comprises transducin.

37. The method of claim 27, wherein the assaying comprises determining an amount of GTP $\gamma$ S binding.

38. A T2R76 modulator identified by the method of claim 27.

39. The T2R76 modulator of claim 38, further comprising a modulator selected from the group consisting of a protein, a peptide, an antibody, a nucleic acid, and a small molecule.

40. A method for modulating bitter taste perception in a subject, the method comprising:

- (a) preparing a composition comprising a modulator of claim 38;
  - (b) administering an effective dose of the composition to a subject, whereby bitter taste perception is altered in the subject.
41. The method of claim 40, wherein the composition further comprises a food, a beverage, an oral wash, a dentifrice, a cosmetic, or a pharmaceutical.
42. The method of claim 40, further comprising co-administering the composition comprising a modulator and a composition selected from the group consisting of a food, a beverage, an oral wash, a dentifrice, a cosmetic, and a pharmaceutical.
43. The method of claim 40, wherein the subject is a mammal.
44. The method of claim 43, wherein the mammal is a human.
45. A method for identifying modulator of a T2R76 polypeptide, the method comprising:
- (a) exposing a T2R76 polypeptide alone or a T2R76 polypeptide expressed in association with at least one other T2R polypeptide to one or more test substances;
  - (b) assaying binding of a test substance to the isolated T2R76 polypeptide or a T2R76 polypeptide combination; and
  - (c) selecting a candidate substance that demonstrates specific binding to the T2R76 polypeptide.
46. The method of claim 45, wherein the T2R76 polypeptide comprises:
- (a) a polypeptide of SEQ ID NO:2;
  - (b) a polypeptide substantially identical to SEQ ID NO:2;
  - (c) a polypeptide encoded by a nucleic acid molecule of SEQ ID NO:1; or
  - (d) a polypeptide encoded by a nucleic acid molecule substantially identical to SEQ ID NO:1.



47. The method of claim 46, wherein the T2R76 polypeptide further comprises a polypeptide encoded by a nucleic acid molecule selected from the group consisting of:

- (a) an isolated nucleic acid molecule encoding a polypeptide of SEQ ID NO:2;
- (b) an isolated nucleic molecule of SEQ ID NO:1;
- (c) an isolated nucleic acid molecule which hybridizes to a T2R76 nucleic acid sequence under wash stringency conditions represented by a wash solution having less than about 200 mM salt concentration and a wash temperature of greater than about 45°C, and which encodes a T2R76 polypeptide; and
- (d) an isolated nucleic acid molecule differing by at least one functionally equivalent codon from the isolated nucleic acid molecule of one of (a), (b), and (c) above in nucleic acid sequence due to the degeneracy of the genetic code, and which encodes a T2R76 polypeptide encoded by the isolated nucleic acid of one of (a), (b), and (c) above.

48. The method of claim 47, wherein the isolated T2R76 polypeptide comprises SEQ ID NO:2.

49. A T2R76 modulator identified by the method of claim 48.

50. The T2R76 modulator of claim 49, further comprising a modulator selected from the group consisting of a protein, a peptide, an antibody, a nucleic acid, and a small molecule.

51. A method for modulating bitter taste perception in a subject, the method comprising:

- (a) preparing a composition comprising a modulator of claim 49;

- (b) administering an effective dose of the composition to a subject, whereby bitter taste perception is altered in the subject.

52. The method of claim 51, wherein the composition further comprises a food, a beverage, an oral wash, a dentifrice, a cosmetic, or a pharmaceutical.

53. The method of claim 51, further comprising co-administering the composition comprising a modulator and a composition selected from the group consisting of a food, a beverage, an oral wash, a dentifrice, a cosmetic, and a pharmaceutical.

54. The method of claim 51, wherein the T2R76 modulator is selected from the group consisting of a protein, a peptide, an antibody, a nucleic acid, and a small molecule.

55. The method of claim 51, wherein the subject is a mammal.

56. The method of claim 55, wherein the mammal is a human.

57. A method for reducing bitter taste perception of a bitter compound, the method comprising co-administering a T2R76 inhibitor and the bitter compound to a subject.

58. The method of claim 57, wherein the co-administering comprises administering a composition comprising the T2R76 inhibitor admixed with the bitter compound.

59. The method of claim 57, wherein the T2R76 inhibitor further comprises a modulator selected from the group consisting of a protein, a peptide, an antibody, a nucleic acid, and a small molecule.

60. The method of claim 57, wherein the bitter compound comprises a food, a beverage, an oral wash, a dentifrice, a cosmetic, or a pharmaceutical.

61. The method of claim 57, wherein the subject is a mammal.

- 62. The method of claim 61, wherein the mammal is a human.
- 63. A method for enhancing bitter taste perception of a compound, the method comprising co-administering a T2R76 agonist and the compound to a subject.
- 64. The method of claim 63, wherein the co-administering comprises administering a composition comprising the T2R76 agonist admixed with the compound.
- 65. The method of claim 63, wherein the T2R76 agonist further comprises a modulator selected from the group consisting of a protein, a peptide, an antibody, a nucleic acid, and a small molecule.
- 66. The method of claim 63, wherein the subject is a mammal.
- 67. The method of claim 66, wherein the mammal is a human.

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